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User Handbook

for the

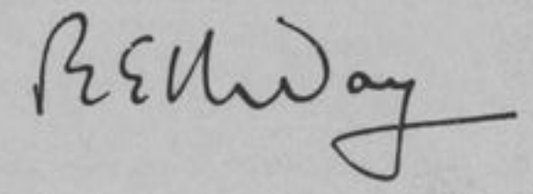
RIFLE, 0.22 in., No. 8, MK. 1

Land Service

1961

This publication supersedes W.O. Code No. 10141

BY COMMAND OF THE ARMY COUNCIL



THE WAR OFFICE,
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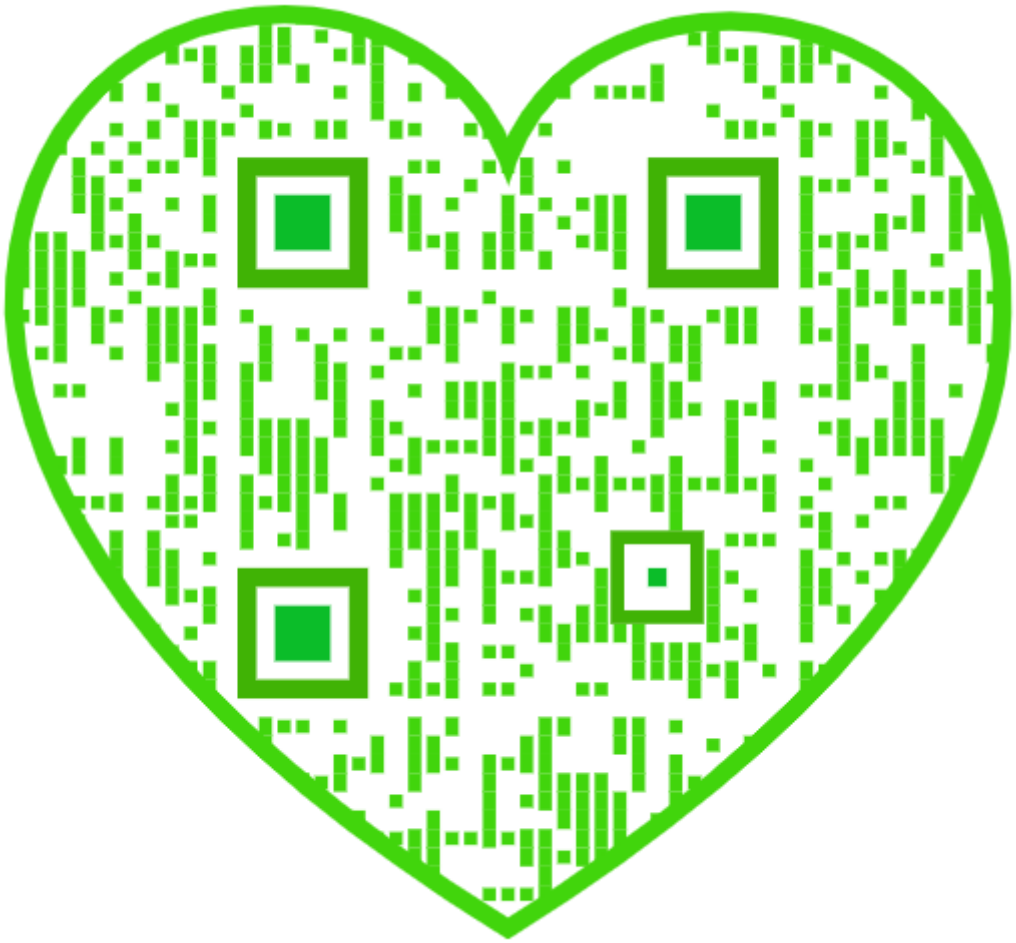

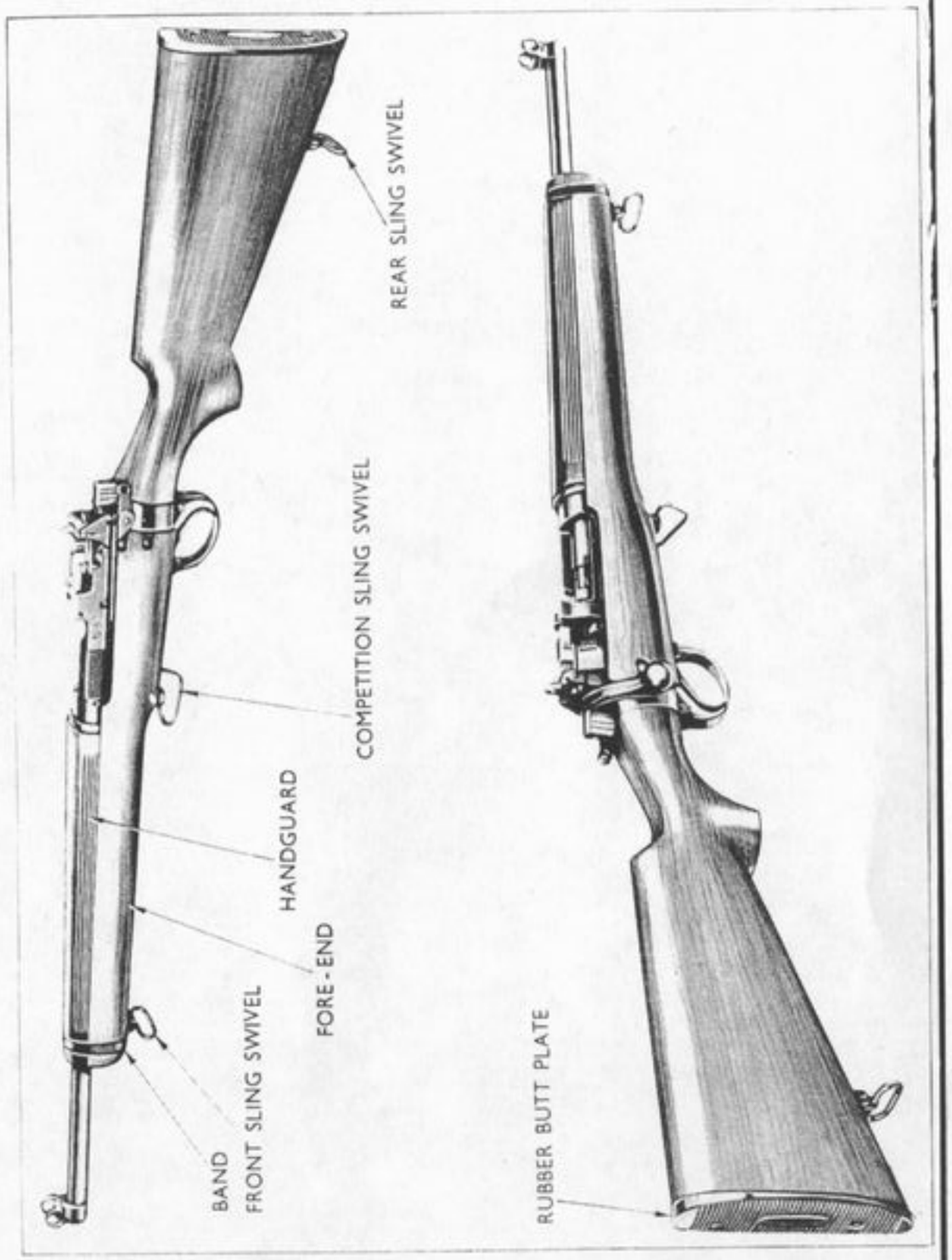

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Section 1 - General Description

INTRODUCTION

1. The rifle is a single-shot, bolt operated weapon, similar in characteristics to the No.4 Service Rifle upon which its design is based.

2. Introduced into the Service as a training rifle, the No.8 was, however, designed as an accurate match shooting rifle. It enables the Services to compete on equal terms with civilian riflemen in small bore competitions.

3. Provision is made for the alteration of the trigger pressures to suit either service or match shooting conditions, and for the fitting of special competition sights.

4. Many of the parts are interchangeable with the No.4 Rifle.

TECHNICAL DETAILS

5.	(a) Calibre	0.22 in.
	(b) Length of rifle, overall (normal butt)	41.05 in.
	(c) Length of barrel	23.36 in.
	(d) Weight of rifle	8 lbs 14 ozs.(approx)
	(e) Number of grooves	6
	(f) Pitch of rifling	1 turn in 16 in.
	(g) Twist of Rifling	Right hand
	(h) Head Space	L.045 H.047
	(j) Striker protrusion	H.038 L.034
	(k) Sight radius	27.14
	(l) Type of sights	Rear aperture)Service Fore blade)condition
	(m) Sight range	25 to 100 yds.

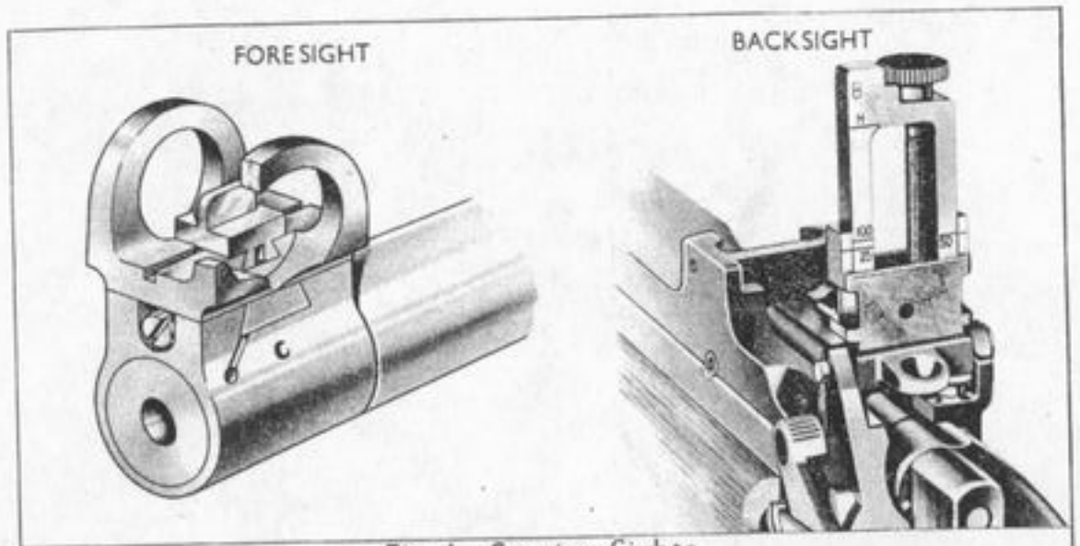

Fig. 1 Service Sights

FURNITURE AND EXTERNAL FITTINGS

6. Any of the approved hardwoods are used, i.e. Walnut, Beech, or Birch. The front and rear handguards, stock fore-end and stock butt being matched for colour.

7. The fore-end is slightly wider than that of the No.4 Rifle in order to provide a better grip for the firer's forward hand.

8. Three sling swivels are provided, there being an additional combination swivel and front trigger guard screw which can be used for the fitting of a match shooting sling.

9. The stock butt is of the pistol grip type and is available in three sizes; Long, Normal and Short.

SIGHTS

10. Service Sights (Fig.1). - The fore and backsights issued with the rifle are similar to those of the No.4 rifle, except that the graduations are for ranges of 25, 50 and 100 yards, with an additional harmonization (H) position provided for landscape target practices.

11. Match Sights. - The standardized dovetail ensures quick replacement of the service foresight with standard commercial pattern match foresights.

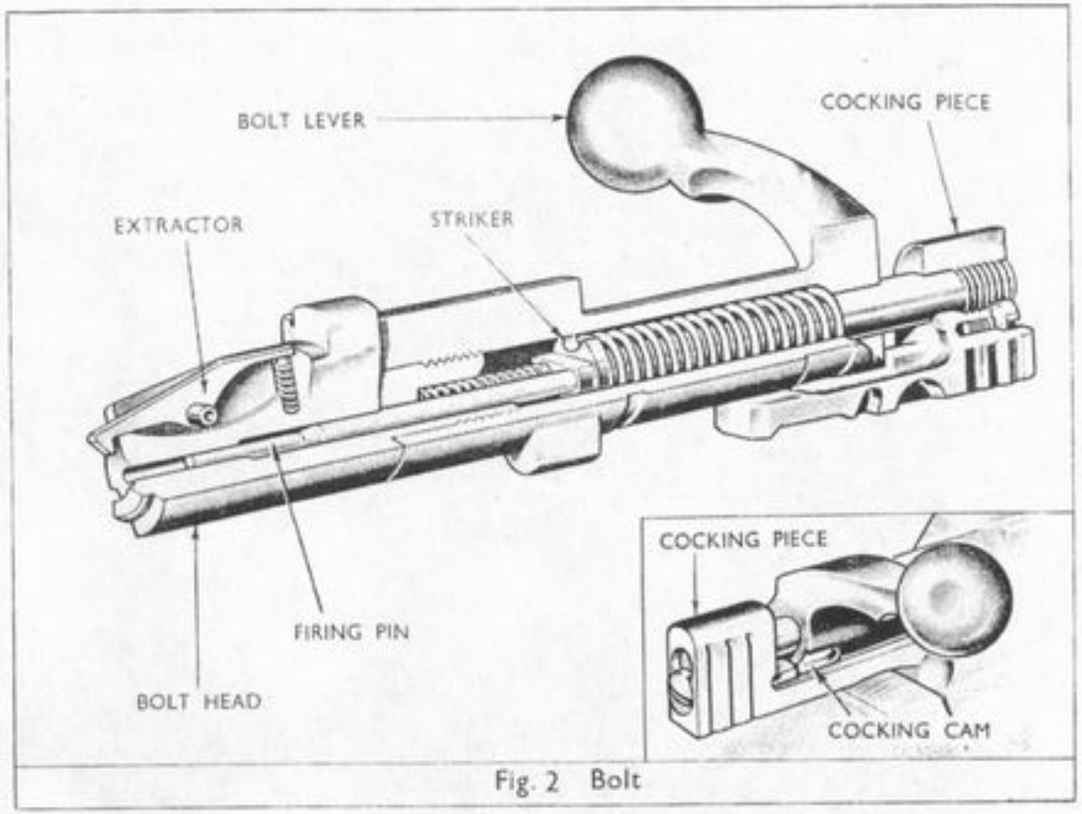

Fig. 2 Bolt

Tapped holes in the body are provided for the fitting of a trade type match backsight.

BOLT (Fig.2)

12. The No.8 differs from the No.4 in that cocking of the action is achieved by raising and lowering of the bolt lever only. Although it is necessary to draw the bolt to the rear in order to load, it is not necessary to do so merely to re-cock the rifle.

13. The rear end of the bolt houses a single cocking cam. When in the withdrawn position the cocking piece is held to the rear against the rear end of the bolt.

14. The striker is shorter than that of the No.4 rifle and is designed to drive forward an independent firing pin which is housed in the bolt-head and is off-set radially in order to strike the rim of, and fire, the 0.22 in. cartridge.

BODY

15. The body is either a modified No.4 rifle body, or is a newly manufactured body similar to that of the No.4 rifle, with certain internal machining operations eliminated. The main differences are:-

(a) The boltway is bored larger at the front end to permit entry of the rear end of the No.8 rifle barrel.

(b) The lower part of the body is widened to accommodate the cartridge platform.

(c) The rib on the No.4 rifle body, which retains the No.4 rifle bolt-head is machined off.

16. Tapped holes on the left side of the body are provided to take a special match backsight.

TRIGGER MECHANISM

17. The trigger of the No.8 rifle can be adjusted to give either the service double pressure, or a single match pressure. The weight and length of the pressure can be adjusted in both cases.

18. During release of the sear, the cocking piece is supported by the sear cradle. This eliminates drag between the sear and cocking piece bents and ensures a clean and crisp let-off.

BARREL

19. The barrel is shorter and heavier than that of the No.4 rifle. Its extra weight reduces to a minimum the vibrations set up in firing and ensures a high degree of accuracy.

20. It has a plain bearing in rear of the breeching up thread; this brings the chamber further to the rear and permits quick loading in the lying position.

21. The rifling is tapered, being deepest at the breech end and running out to almost bore diameter at the muzzle. The tapering of the rifling gives an improved gas seal and also removes the initial engraving from the bullet by the time it leaves the muzzle. The purpose of this is to improve the standard of accuracy with varying brands of ammunition.

22. The chamber has a plain taper and the breech face is counter-bored to take the rim of the cartridge; it is further counterbored to accommodate the rim of the bolt-head.

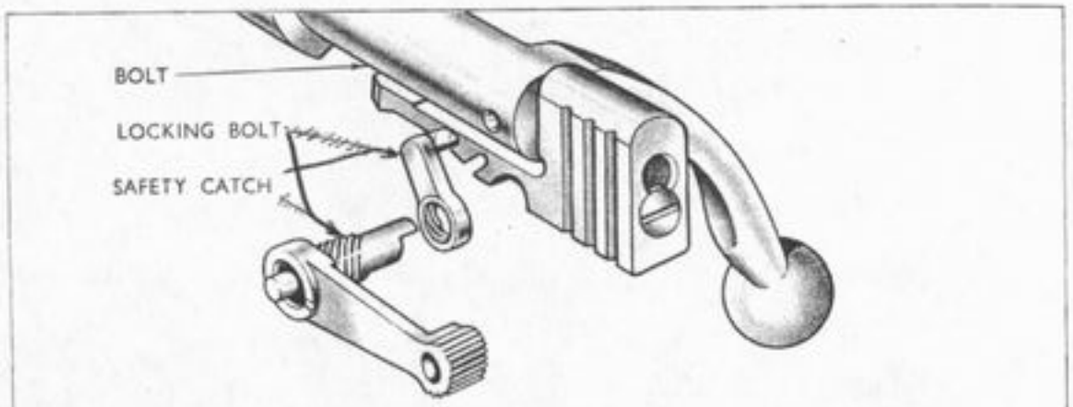

Fig. 3 Safety Devices

SAFETY DEVICES (Fig.3)

23. The applied and mechanical safety devices are similar to those of the No.4 rifle except for the following differences:-

(a) The safety catch engages in a hole in the bolt, instead of in a cam slot.

(b) The rear safety recess on the cocking piece of the No.8 rifle is semi-circular and, unlike the No.4 rifle, does not cause the cocking piece to be withdrawn when the safety catch is applied with the cocking piece in the forward position.

STOCKING

24. The bearings are the body seating, the reinforce, the middle of the barrel and the muzzle.

CARTRIDGE PLATFORM AND EJECTOR (Fig.4)

25. There is no magazine. A cartridge platform is situated just in rear of the chamber. The ejector is integral with the cartridge platform.

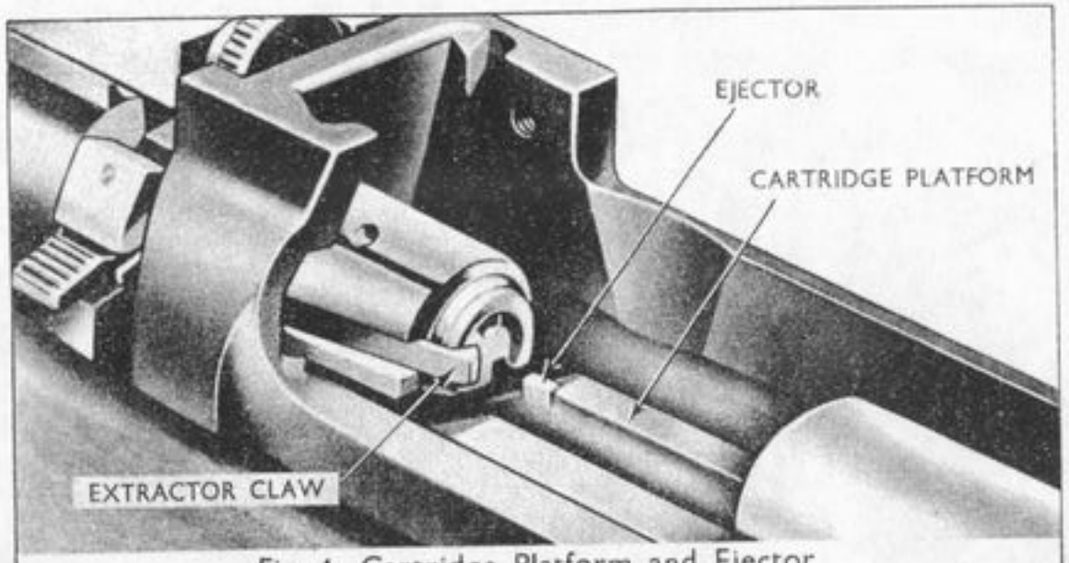

Fig. 4 Cartridge Platform and Ejector

CONVERSION TO L2A1

26. Some rifles will be converted for use with R.A.C. miniature range training by the removal of the foresight and backsight and handguards and stocks. Such rifles will be known as "Rifle, aiming, 0.22 in. L2A1".

Section 2 – Operation

LOADING

27. As there is no magazine, the rifle must be loaded by hand for each shot, as follows:-

(a) Push safety catch fully forward.

(b) Raise the bolt lever and draw bolt fully to the rear.

(c) Place a cartridge in the groove of the cartridge platform, then press the round forward with the thumb or finger until the bullet has entered the chamber and resistance is felt.

(d) Grasp the knob of the lever, thrust the bolt sharply forward as far as it will go, then rotate the bolt lever downwards, ensuring that it is fully down.

(e) Repeat operation (b) to (d) for each successive round.

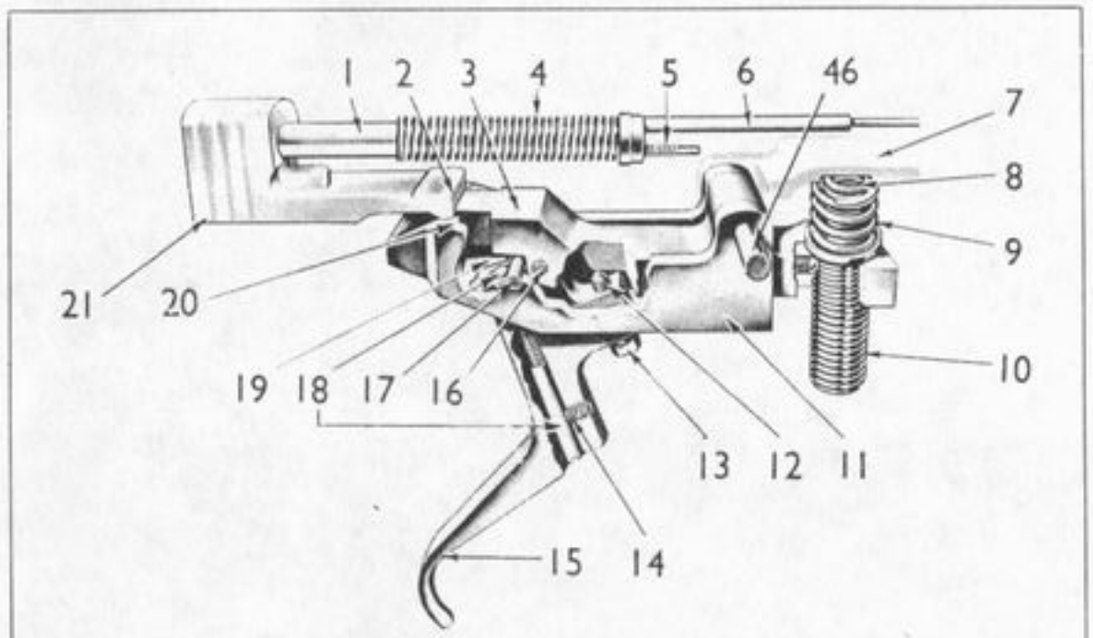

Fig.5 Trigger mechanism

TRIGGER MECHANISM (Figs. 5, 6 and 7)

28. Double Pressure - Service Condition (Figs. 5 and 6). - When, with the weapon cocked, the trigger (15) is pressed, the trigger rotates initially about the cradle pin (17) as a fulcrum, levering down the sear (3) in it's cradle (11), and rotating it about it's axis pin (46). This compresses the inner and outer sear springs (8) and (9) and produces the first pressure. Continued pressure on the trigger causes the protruding end of the pressure setting screw (18) to contact the flat on the underside of the sear cradle (19), to which the fulcrum point is then transferred and the leverage altered. This produces the second pressure.

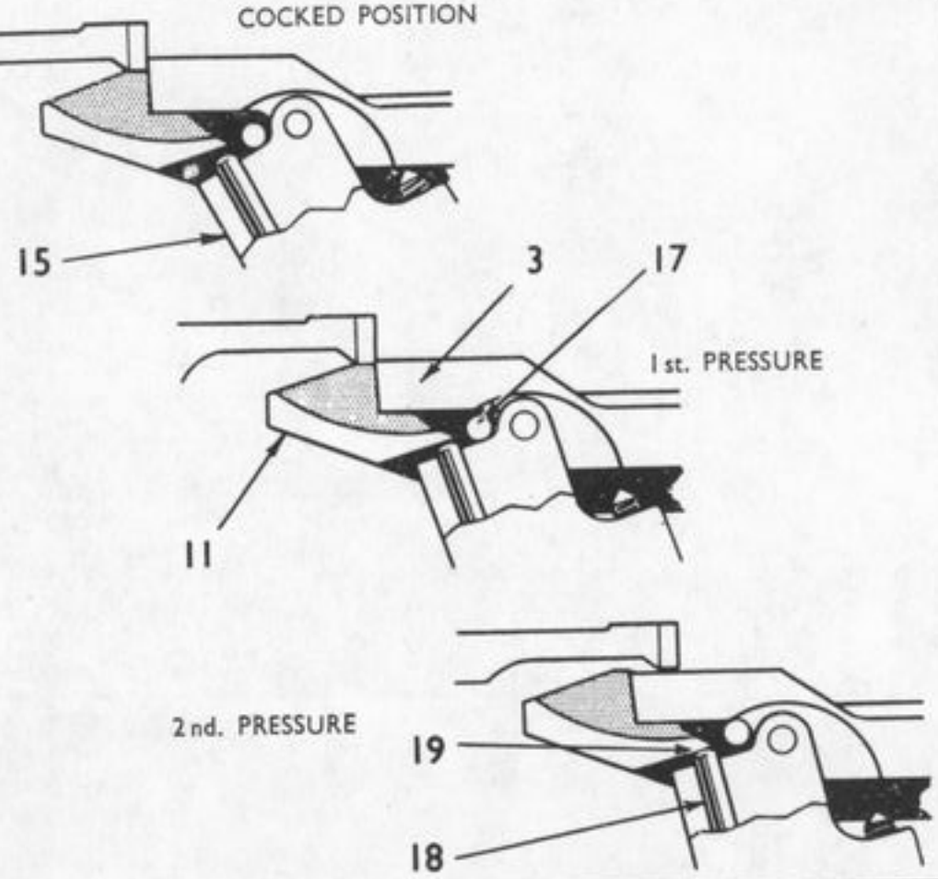

Fig.6 Double Action (Service)

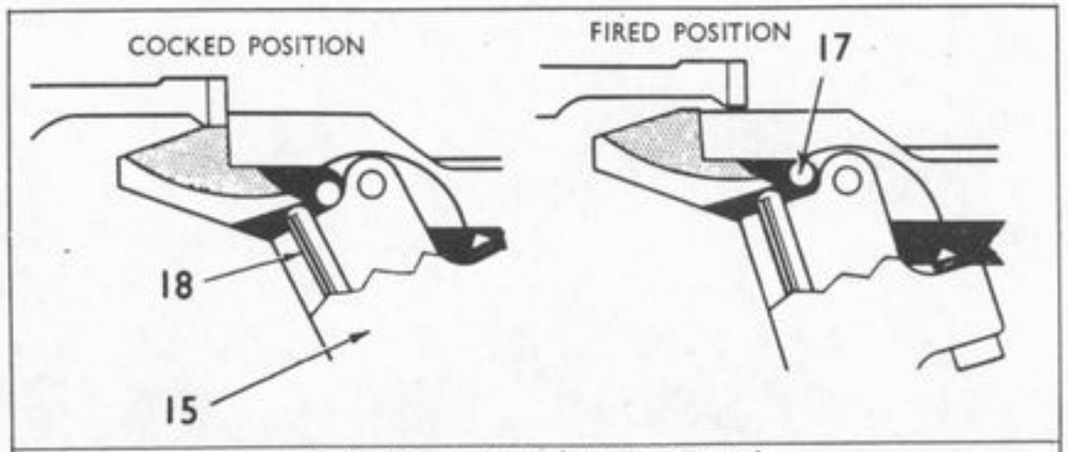

Fig.7 Single Action (Competition)

29. Single Pressure - Match Condition (Figs. 6 and 7). - When it is required to adjust the trigger mechanism to a single pressure for match conditions, the outer sear spring (9) is removed. This considerably reduces the trigger pressure. The pressure setting screw (18) is then screwed in sufficiently for the trigger (15) to rotate solely about the end of the screw and to avoid all initial contact with the cradle pin (17).

30. Weight of Trigger Pressures. - The weights of both single and double action pressures can be adjusted to fine limits by adjusting the compression of the inner sear spring (8). This is accomplished by screwing the sear spring cup (10) in or out.

SEAR

31. Sear Engagement (Fig.8). - The engagement of the sear (3) and the bent of the cocking piece (2) is adjusted, before the weapon leaves the factory, to a height of 0.03 in. by means of the trigger setting screw (12). This setting normally should not require adjustment.

32. Sear Release (Fig.8). - The pressure exerted by the compressed sear springs (8 and 9), transferred via the sear (3) and trigger (15), combined with the direct pressure on the trigger, produces an upwards thrust through the sear cradle pads (20) on to the base of the cocking piece (21). This upwards thrust counterbalances the downward drag of the bent of the sear on the bent of the cocking piece (2) and prevents any axial movement of the bolt. When the sear is released, the striker spring (4) carries forward the cocking piece and striker (21 and 1) to drive the firing pin (6) forward on to the rim of the cartridge, compressing the firing pin spring (5) in so doing.

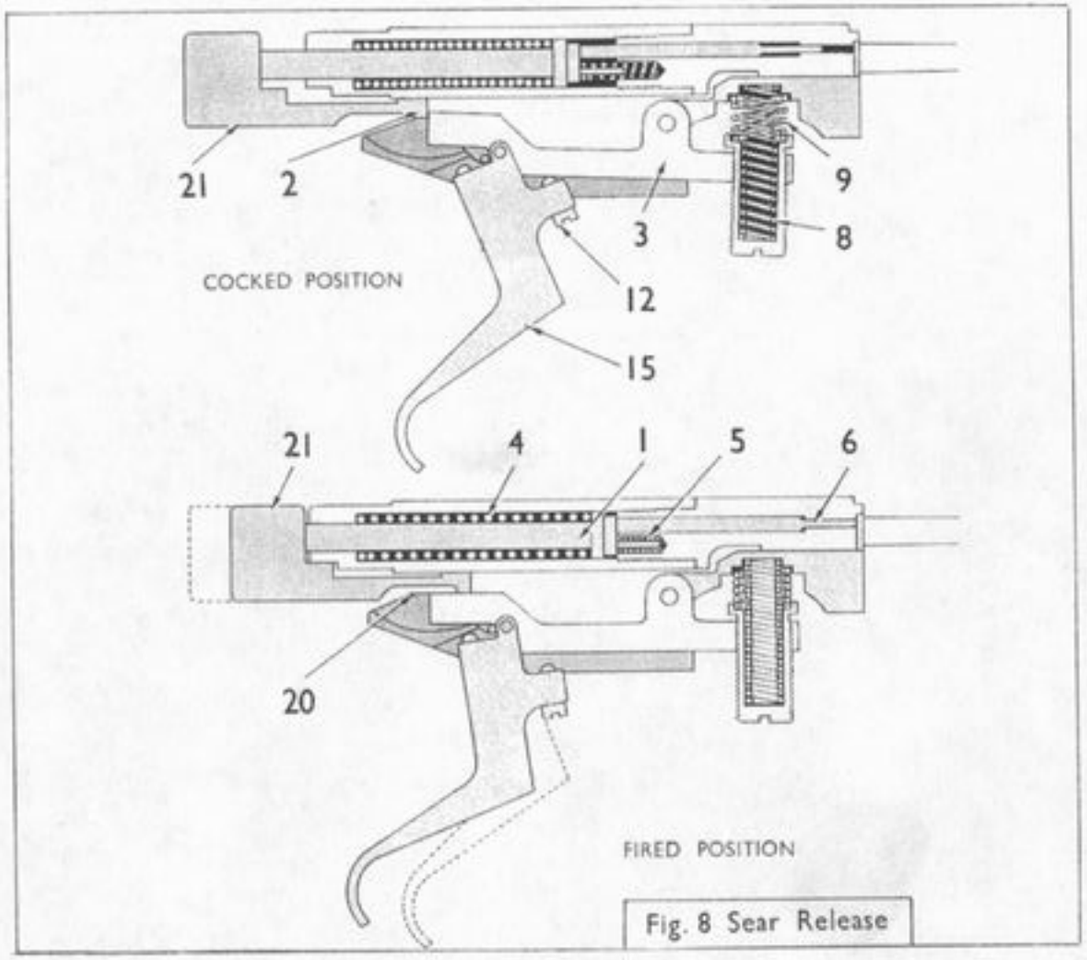

Fig. 8 Sear Release

WITHDRAWAL OF FIRING PIN

33. When, after firing, the bolt lever is raised, the striker (1) and cocking piece (21) are withdrawn by the action of the stud on the cocking piece in the cam slot of the bolt - similar to the action of the No.4 rifle. The withdrawal of the striker allows the firing pin spring (5) to re-assert itself and withdraw the firing pin.

EXTRACTION AND EJECTION

34. When the bolt lever is raised and the bolt withdrawn, the empty case is removed from the chamber by the claw of the extractor (Fig.4) pulling on the rim of the case. The empty case is held between the claw of the extractor and the face of the bolt during withdrawal of the bolt until the ejector (Fig.4) strikes the rim of the case and ejects it from the rifle.

Section 3 - Servicing

STRIPPING

35. To Remove Bolt From Rifle (Fig.9). - Raise the backsight (22); press down the bolt head catch (23); lift bolt lever (24) and pull bolt back to its full extent. Release bolt head catch; raise the bolt head, and withdraw bolt from rifle.

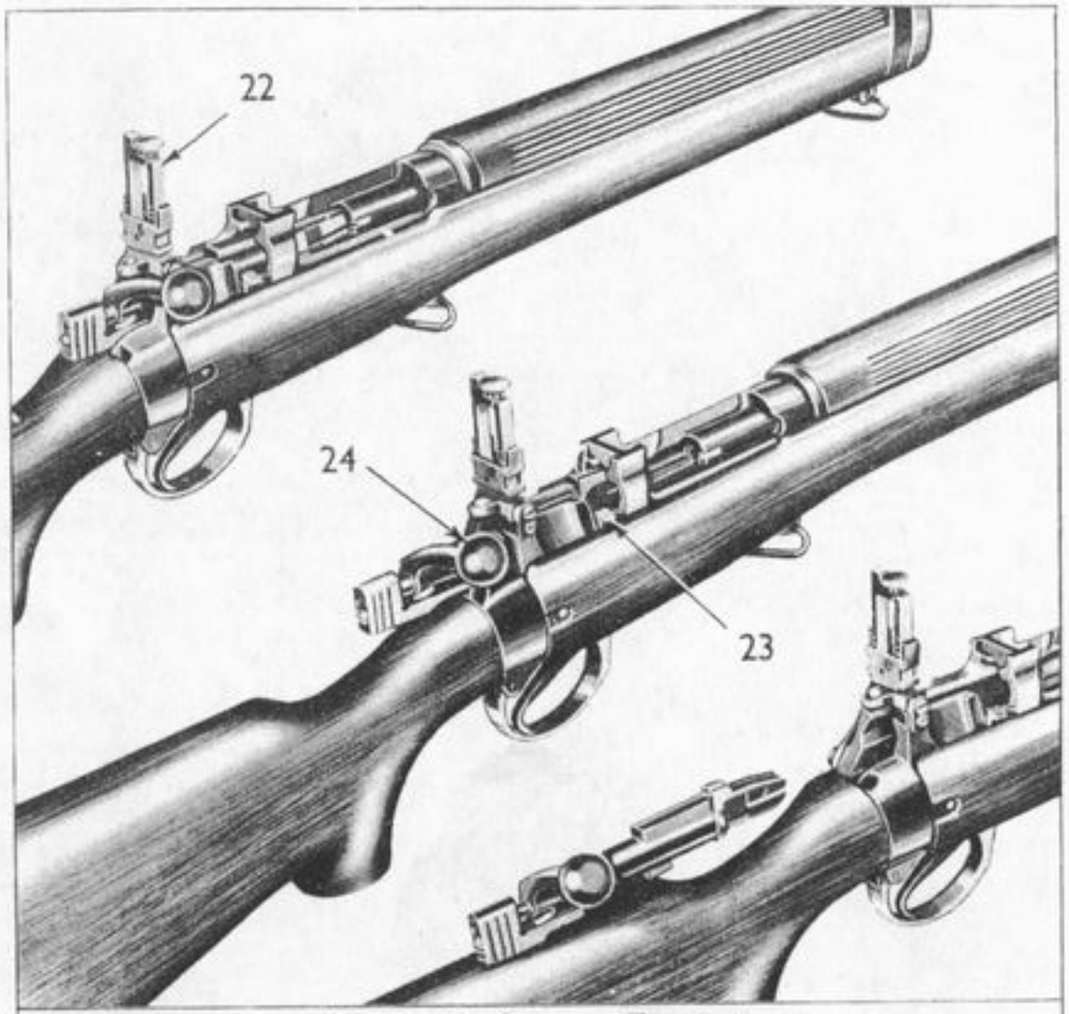

Fig. 9 To Remove The Bolt

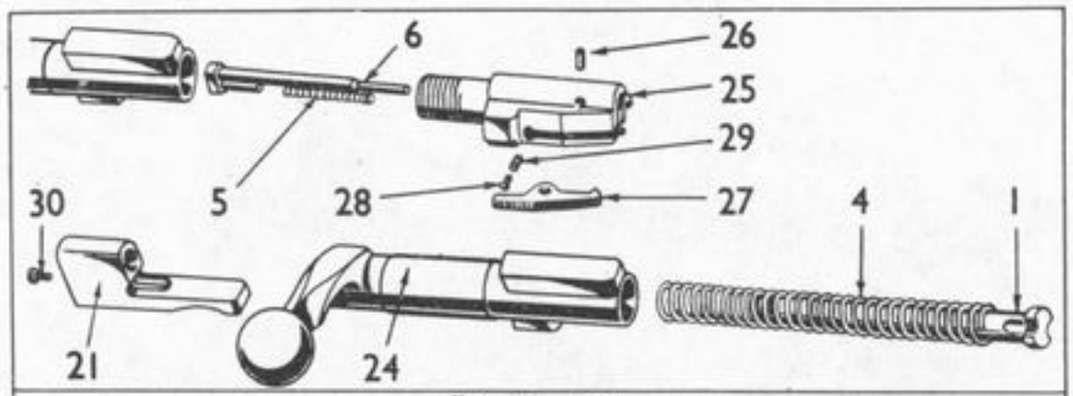

Fig. 10 Bolt

36. To Strip Bolt (Fig.10). - Unscrew the bolt head (25), and pull out the firing pin (6) and firing pin spring (5). With a suitable punch, drive out the extractor pin (26); remove extractor (27), extractor plunger (28), and extractor spring (29). Remove the striker screw (30) from the cocking piece (21), and unscrew the striker (1) with the "Tools Striker No.2" as used with the No.4 rifle. Remove striker and striker spring (4) from the bolt (24).

37. Fore-End and Handguard (Fig.11). - Remove the front swivel screw (31) and remove the swivel (32) and band (33). Lift off the handguard (34), remove the front trigger guard screw (35), and remove the spring washer (36). Remove rear trigger guard screw (37); remove trigger guard (38) and trigger guard filler (39). Remove the fore-end (40), and collar (41).

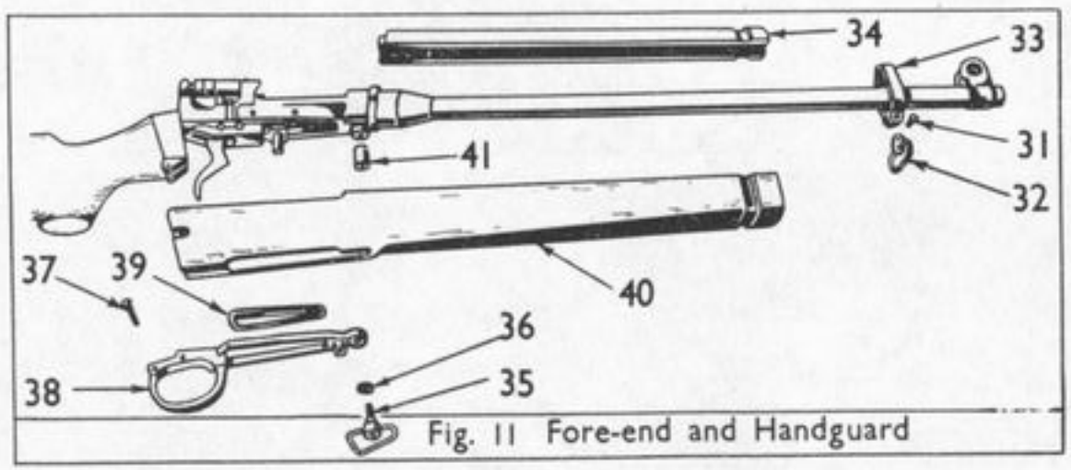

Fig. 11 Fore-end and Handguard

38. Safety Catch and Locking Bolt (Fig.12). - Remove the locking bolt screw (42); locking bolt spring (43) and remove the locking bolt (44) and safety catch (45) from their housing. Unscrew safety catch from locking bolt.

39. Trigger Mechanism (Fig. 13). - Drive out the rear cartridge platform pin (46) and pull trigger assembly downward out of the body. Remove the inner and outer sear springs (8 and 9) and slide the sear cradle (11) down over the trigger (15). Take out the trigger pin (16) and separate the trigger from the sear (3). Unscrew the sear spring cup (10) from the sear.

40. The sear bolt and its spring, which are housed in the sear to check rotation of the sear spring cup, are burred in and cannot be removed. To strip the trigger, remove the pull-off locking screw (14) and pull-off setting screw (18); remove the trigger setting screw nut (13) and trigger setting screw (12).

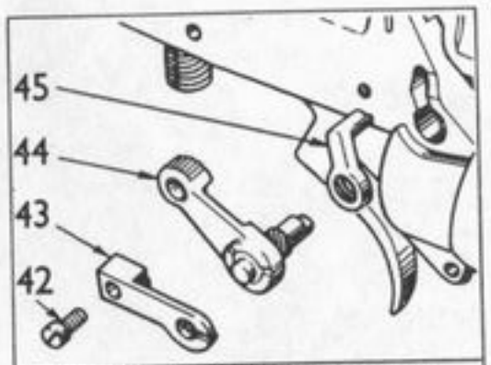

Fig. 12 Safety Catch and Locking Bolt

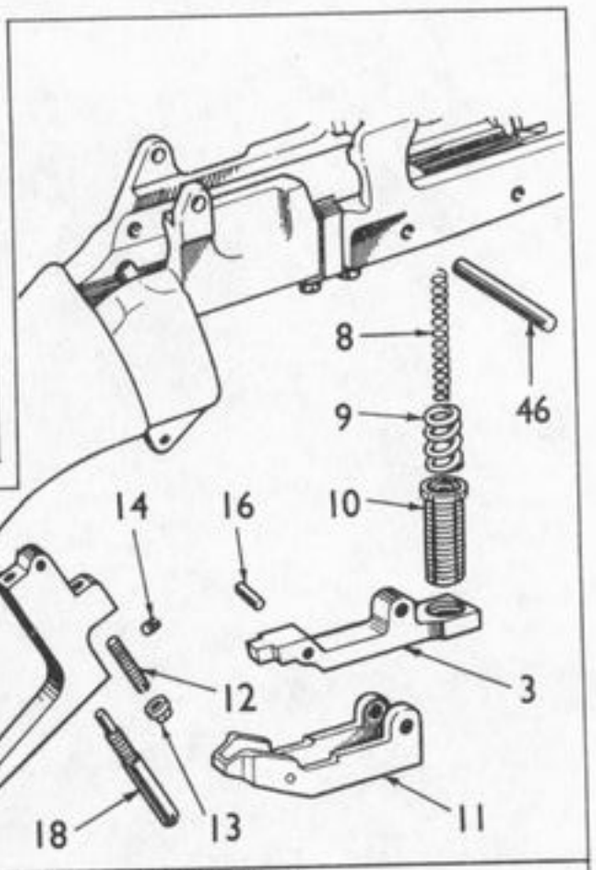

Fig. 13 Trigger Mechanism

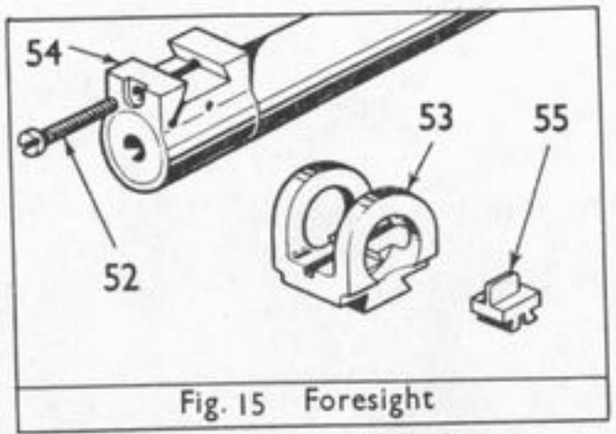

Fig. 15 Foresight

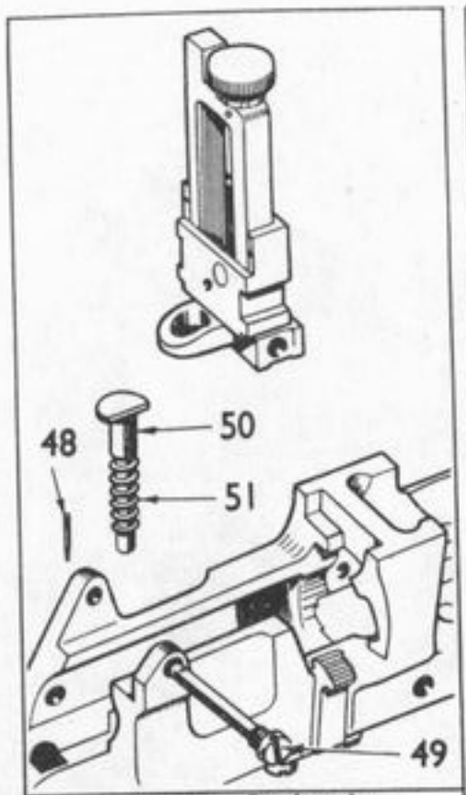

Fig. 14 Backsight

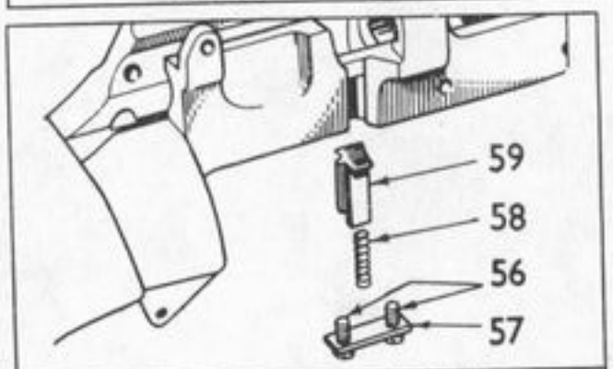

Fig. 16 Bolt Head Catch

41. Cartridge Platform. - The cartridge platform should not be removed, since the hole for the front pin is drilled on assembly, making the platform a special fit to the body. If through wear or breakage it is required to replace the ejector this will be done as a factory repair.

42. Backsight (Fig.14). - Tap out the backsight axis pin retaining pin (48) and drive out the backsight axis pin (49). This releases the backsight assembly. Lift the backsight plunger (50) and its spring (51) from their housing.

43. Foresight (Fig.15). - Unscrew the clamping screw (52) and slide the foresight protector (53) out of its dovetail in the barrel band (54). Tap the foresight (55) out of the dovetail in the foresight protector.

44. The barrel band is pinned and sweated on to a reduced diameter at the end of the barrel and must not be removed.

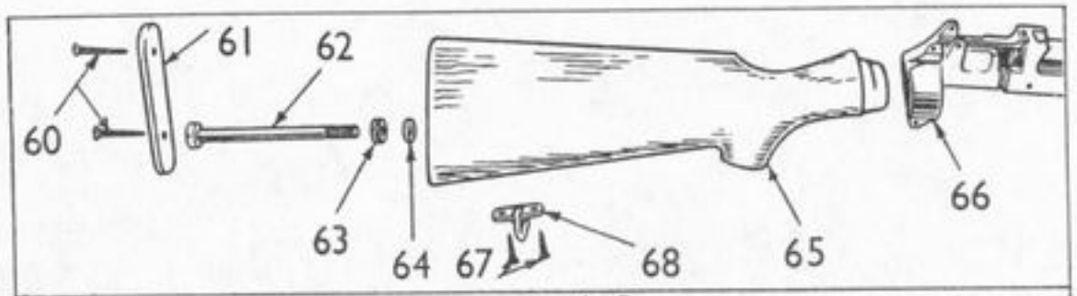

Fig. 17 Stock Butt

45. Bolt Head Catch (Fig.16). - Undo the two screws (56) holding the breech bolt head catch retaining plate (57); lift the spring (58) and breech bolt head catch (59) from their seating.

46. Stock Butt (Fig.17). - Remove the two stock butt plate screws (60) and lift off the butt plate (61). Remove the stock bolt (62) and take the stock bolt spring washer (63) and washer (64) out of the stock butt (65). Pull the stock butt from the body socket (66). Remove rear swivel screws (67) and rear swivel (68).

47. The rifle should be assembled in the reverse sequence of the order of stripping. The only difficulties likely to be experienced are in the securing of the trigger group to the body; screwing the cocking piece onto the striker, and in assembling the safety catch and locking bolt. Instructions on these points are given below.

ASSEMBLING

48. Trigger Group. - To enable the rear cartridge platform pin to be driven in to secure the trigger group, the holes in the rifle body, cartridge platform, sear cradle, and sear must all be exactly aligned at one and the same time. This is extremely difficult without the aid of a guide drift, and damage to components will result if any attempt is made to drive the pin through the holes when they are aligned by any less precise method.

49. The drift used should be in accordance with the dimensions shown in Fig.18. The holes in the trigger group should be aligned as nearly as possible by eye and the tapered end of the guide drift passed through them; the guide drift should be pushed or gently tapped through until the ground end is flush with the body of the rifle. The end of the rear cartridge platform pin should then be placed on the end of the guide drift, and the guide drift driven through the rifle body by the pin. The ends of the pin and the guide drift should be kept in close contact with each other during the time the pin is being driven through.

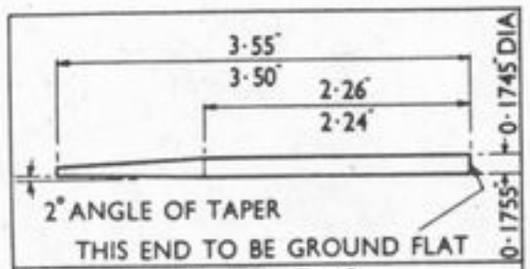

Fig. 18 Drift

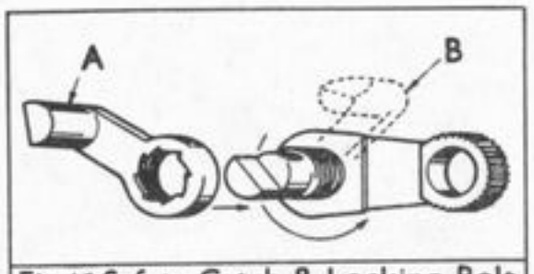

Fig. 19 Safety Catch & Locking Bolt

50. Safety Catch and Locking Bolt (Fig.19). - It is important that the threads should be picked up correctly when the locking bolt is screwed on to the safety catch. To assist in correct assembly, fig.19 shows them (A) positioned as they should be before engagement of thread, and (B) when screwed fully home.

51. Cocking Piece (Fig.20). - To ensure correct functioning it is essential that the cocking piece should correctly be assembled to the striker. The two components should be assembled as shown in the illustration.

ADJUSTMENTS

52. Trigger Mechanism - Conversion from Double to Single Pressure. - Remove the trigger guard and trigger group. Remove the outer sear spring (9) and re-assemble with the inner spring only (8). Loosen the pressure locking screw (14). Screw in the pressure setting screw (18) a half turn at a time until a single pressure is obtained. When the weapon is cocked the pressure setting screw should now bear on the underside of the sear cradle web, not on the sear cradle pin which is not used as a fulcrum in single pressure match condition.

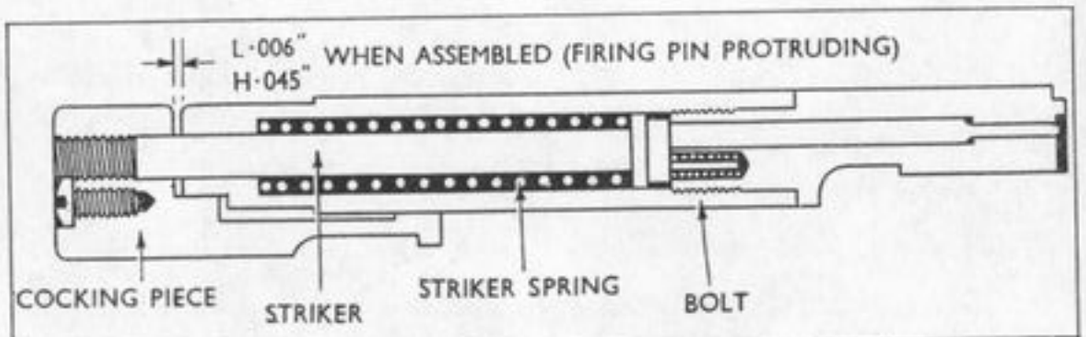

Fig. 20 Assembly of Cocking Piece and Striker

53. The amount of engagement between the bents of the sear and cocking piece decreases with the amount the pressure setting screw has been screwed in. This adjustment must not be carried to excess as it will give rise to a dangerous hair-trigger condition. When the desired length of pressure has been obtained tighten the pressure locking screw (14) and adjust the weight of the pressure as described in para. (57) below.

54. Trigger Mechanism - Conversion from Single to Double Pressure.- Remove trigger guard and trigger group. Screw home the sear spring cup, replace the outer sear spring (9), and re-assemble the trigger mechanism. Loosen the pressure locking screw (14), and screw out the pressure setting screw (18) a half turn at a time until a double pressure is obtained.

55. When the weapon is cocked the flat on the top of the trigger should now bear against the cradle pin (17). The length of the pressures can be adjusted by screwing the setting screw in or out.

56. Tighten the pressure locking screw and adjust the weight as described in para. 57 below.

57. Weight of Trigger Pressure. - For single pressure action, with the inner sear spring only in position, the trigger pressure weight can be adjusted by screwing the sear spring cup (10) in or out. This alters the tension of the sear spring. One quarter turn (one click) of the sear spring cup makes a difference of $2\frac{1}{2}$ ounces to the pressure weight.

58. The minimum match condition weight of 3 lbs. can be adjusted within close limits.

59. For double pressure trigger action both sear springs must be in position. The sear spring cup initially should be screwed fully down into the sear and little subsequent adjustment will be necessary. Screwing up the sear spring cup will increase the tension of both springs. It must be ensured that too much tension is not placed on the springs as, should the outer spring be compressed so that it is coil on coil, the trigger mechanism will be damaged when operated in that condition.

60. Adjustment of the sear spring cup will alter the weight of both first and second pressure; they cannot independently be adjusted.

61. The Standard Service pressures are:-

(a) 1st Pressure 3 to 4 lbs.

(b) 2nd Pressure 5 to $6\frac{1}{2}$ lbs.

STOCKING UP

62. Test for bearings on body and barrel. Hold the barrel and press the fore-end of the stock fore-end away from the barrel. This should require a pressure of 3 to 5 lbs., and when the pressure is removed the stock fore-end should return to its seating on the barrel.

ZEROING

63. The No.8 rifle is zeroed, by alterations to the size and position of the foresight, in a manner similar to that used with the No.4 rifle. The foresights used are the same as those issued for the No.4 rifle. They are 8 in number ranging from -0.03 in. to +0.075 in. in steps of 0.015 in. One change of foresight (of 0.015 in.) will make a vertical alteration of MPI of approximately 1/2 in. at 25 yards.

64. The rifle should be zeroed so that the MPI is at the point of aim with the backsight set for the range used.

65. The foresight should be set laterally with the Tool, Foresight, cramps No.3.

ALTERING LENGTH OF BUTT

66. Three different lengths of butt, long, medium and short are provided. The variation is the same as for the No.4 rifle - 1/2 inch each side of a medium length of approximately 13 inches.

67. The method of stripping the butt for exchange of size is shown in Section 1, para.46.

CARE AND CLEANING

68. The exterior and working parts should be cleaned in the same manner as the No.4 rifle.

69. The 0.22 in. ammunition issued to the Services, and most makes of commercial ammunition, are non-rusting, therefore it normally is not necessary to clean the bore after firing. The deposit remaining in the barrel after firing is a preservative and should not be removed. It may, however, be required to clean the bore tp remove foreign matter other than the preservative deposited by the ammunition, when putting the rifle into storage for a long period or when changing from one brand of ammunition to another. When cleaning of the bore is carried out the No.6 cleaning rod with Brush

and Cleaner should be u. i. Regulation flannelette, size 2 x 1.1/8 in., and oil should be used. It is not necessary to use boiling water.

ADDITIONAL TECHNICAL POINTS

70. Mainspring. - The bolt should be removed from the rifle in order to check the tension of the mainspring. The tension of the spring is ascertained by weighing the effort required to move the cocking piece in both the fired and cocked positions.

Mean weight in fired position = 13 lbs.
Mean weight in cocked position = 15¼ lbs.

If in the fired position the weight falls below 12 lbs. the mainspring should be replaced.

71. Extractor. - The approximate mean weight exerted by the extractor spring is 3 lbs. This should be tested by exerting pressure on the tail of the extractor, as it is difficult to weigh by lifting the claw and may cause damage to the extractor.

72. Sear and sear cradle. - The setting of sear and sear cradle should be checked from the boltway, on the assembled rifle, to have a clearance of 0.03 in.

73. Barrel. - Gauge bore with cylindrical acceptance plugs L.0.216 inch must run. The barrel should be free of any lateral influence by the fore-end.

Section 4 - Examination

BOLT

74. Examine for wear, corrosion, and burrs. Remove all burrs by stoning, taking care to avoid removing any metal (other than the burr) from the rear faces of the locking lugs and the cartridge face.

75. Examine the bolt head for corrosion, wear, and burrs. Remove any burrs by stoning. Ensure that the extractor, extractor plunger, and extractor spring work freely in their recesses.

76. Examine the extractor and firing pin for wear, damage, corrosion and distortion. Examine the extractor spring, firing pin spring, and striker spring for corrosion, fractures and collapsed coils.

77. Examine the cocking piece and striker for burrs, distortion and damaged threads.

BODY

78. Examine for corrosion, burrs, distortion and fractures. Ascertain that the cartridge platform pins are a tight fit.

TRIGGER GROUP

79. Examine the components for burrs, corrosion, distortion and damaged threads.

80. If the top corner of the sear bent is rounded, a little metal may be stoned from the upper surface to correct it. Care must be taken to avoid altering the angle between the top and rear faces of the sear, and stoning must not be resorted to unless it is considered that the fault has developed to an extent which will cause a "woolly" release of the cocking piece.

FURNITURE

81. Examine the furniture for cracks or other damage and ensure that the stock butt is a firm fit in the butt socket. Examine the stock fore-end and handguard for warping.

Section 5 - Competition Shooting

82. The sights issued with the No.8 rifle are replicas of those on the full-bore service rifle and are designed primarily for use under service firing conditions. For competition shooting under Match conditions, more accurate sights, capable of fine adjustments will be required. These match sights will not be issued, but will be provided, if required, by individuals, or rifle clubs in the same way as special sights are used for S.R.b shooting at Bisley and elsewhere.

83. To assist in the fitting of Match backsights to the No.8 rifle, three holes have been provided on the left side of the body. The three holes are tapped for 4 B.A. and 3 B.A. threads and are normally closed with a cheese-headed screw to prevent the ingress of dirt. The screws are removed before fitting a Match backsight.

84. It may be necessary to remove the Service backsight before certain types of Match sights can be fitted to the rifle.

85. The Service foresight is designed for easy removal when it is required to fit a Match foresight of the tunnel variety. The dovetail on the block is of standard size and will take the normal commercial pattern of foresights. When fitting certain types of commercial foresights it may be necessary to make a small groove in the underside of the sight in order to accommodate the clamping screw. It is emphasized that if any modification is necessary it must be made to the purchased sight - not to the foresight block of the rifle.

86. Details of the various trade pattern match sights suitable for fitting to the No.8 rifle, together with advice and information on small bore matters generally, may be obtained from the Army Rifle Association, or from the National Small Bore Rifle Association.